Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Due Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**AB Calculus Problem Set – Applications of Derivatives (Calculator ok)**

1.) For the function on the closed interval [–6, 6], answer the following questions:

* 1. List all “important points” (endpoints, critical points and possible inflection points)

|  |  |  |
| --- | --- | --- |
| X | Y | Type of Point (absolute extreme, local extreme, inflection or nothing) |
|  |  |  |
|  |  |  |
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|  |  |  |
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* 1. At what x value is there a local minimum? Justify.
  2. At what x value is/are there point(s) of inflection? Justify.
  3. Sketch the function on the interval [–6, 6] on the axes below using the information from parts (a) through (d)



2.) Related Rates



3.) Using the function, approximate  by using a linear approximation centered at x = 0.

4.) A function is *continuous* and *differentiable* for all x values. If f(2) = -1 and f(4) = 7, explain why each of the following must be true. It is not enough to only state the theorem involved, you must explain or show steps.

1. There exists a k such that f(k) = 0 for some k on [2 , 4].
2. There exists a c such that f’(c) = 4 for some c on [2, 4].
3. There exists a p such that f(p) f(x) for all x on [2, 4].